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EXAMINER	
COX, ALEXIS K	
ART UNIT	PAPER NUMBER
3744	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,716	KAGA ET AL.	
	Examiner	Art Unit	
	ALEXIS K. COX	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/13/2006, 6/11/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 19-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 19, the limitation on lines 6 and 7 of claim 19 "between and including the upper limit temperature to the lower limit temperature" is unclear as to whether the lower limit temperature is included or not. For the purpose of examination, the examiner interprets this to include the lower limit temperature. Alteration to "between and including the upper limit temperature and the lower limit temperature" is suggested. On lines 10-12 of claim 19, the limitation "wherein the compressor is controlled by the operation control means wherein the control characteristic is a control-cooling characteristic when the physical amount is in the control-cooling zone from the upper limit temperature to the lower limit temperature" is redundant within the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 17-23, 30, 35, and 36 are rejected under 35 U.S.C. 102 (b) as being anticipated by Kobayashi et al (US Patent No. 4,662,185).

Regarding claim 17, Kobayashi et al discloses a refrigerating storage cabinet (refrigerator, see column 1 line 8) for refrigerating an inner atmosphere and including a refrigeration unit comprising a compressor (see column 1 line 9) and an evaporator which is inherently present in order to cool the interior of the refrigerator of Kobayashi et al, a storing means (5, see column 2 lines 16-17) for storing a cooling characteristic comprising a target physical amount as a function of operating time (2, Ts, see column 2 lines 25-26), a physical amount sensor able to detect a physical amount corresponding to the target physical amount at predetermined intervals of operating time (1, Ta, see column 2 lines 23-25 and lines 57-58); wherein the compressor comprises a plurality of performance levels (see column 2 lines 31-35); and an operation control means (5, see column 2 lines 16-17 and 29-35) for controlling the compressor by selecting an appropriate on' of the plurality of performance levels based upon a relationship between the physical amount and the target physical amount for a corresponding time (see column 2 lines 31-35 and 58-68).

Regarding claim 18, the physical amount and target physical amount of Kobayashi et al are temperatures (Ta, Ts, see column 2 lines 26-28), the physical amount is the temperature of the inner atmosphere (see column 2 lines 23-25), the compressor is controlled by the operation control means (see column

2 lines 31-35) in which the cooling characteristic is a pull down characteristic (see column 2 lines 48-552) while the physical amount is in a temperature range from above a high temperature to near a set temperature, and the high temperature is higher than the set temperature by more than a predetermined value.

Regarding claim 19, Kobayashi et al discloses the refrigerating storage unit to comprise an upper limit temperature that is higher by the predetermined value than a set temperature (Dn, see column 2 line 48), a lower limit temperature that is lower by the predetermined value than the set temperature (Dm, see column 2 line 54), a control-cooling zone between and including the upper limit temperature to the lower limit temperature (Dm, Dn, see column 2 lines 53-58, see also figure 2) wherein when the physical amount is in the control-cooling zone, the cooling characteristic is a control-cooling characteristic; wherein when the physical amount reaches the lower limit temperature from a temperature higher than the lower limit temperature, the compressor is not operated (see column 3 lines 18-20); wherein when the physical amount reaches the upper limit temperature from a temperature lower than the upper limit temperature, the compressor is operationally controlled by the operation control means (see column 2 lines 31-35).

Regarding claim 20, the refrigerating storage cabinet of Kobayashi et al comprises a speed-controllable inverter compressor (6, 7, see column 2 lines 19-21), with the operation control means comprising a physical amount change computing section computing a physical amount reduction degree at the predetermined intervals of operating time (1, see column 2 lines 23-25), a target

physical amount reduction degree output section providing a target physical amount reduction degree corresponding to the predetermined intervals of operating time (2, 4, see column 2 lines 25-29), a comparing section for comparing the physical amount reduction degree to the target physical amount reduction degree at a corresponding operation time (5, see column 2 lines 29-33), and a speed control section controlling the inverter compressor so that a rotational speed of the inverter compressor is increased when the comparing section indicates that the physical amount reduction degree is smaller than the target physical amount reduction degree, and decreasing the rotational speed of the inverter compressor when the comparing section indicates that the actual physical amount reduction degree is larger than the target physical amount reduction degree (6, see column 2 lines 31-35).

Regarding claim 21, Kobayashi et al discloses the refrigerating storage unit to have a pull down characteristic that is a linear function, with the target physical amount reduction degree being a constant value (see column 2 lines 48-52).

Regarding claims 22 and 23, Kobayashi et al discloses the refrigerating storage cabinet to have a control-cooling characteristic that is a linear function (see column 2 lines 53-58), wherein the target physical amount reduction degree is a constant value.

Regarding claim 30, Kobayashi et al discloses the refrigerating storage cabinet to store a plurality of cooling characteristics (see column 2 lines 48-68),

and the operational control means to execute an appropriate one of the cooling characteristics based upon the physical amount.

Regarding claim 35, Kobayashi et al discloses a refrigerating storage cabinet (refrigerator, see column 1 line 8) for refrigerating an inner atmosphere and including a refrigeration unit comprising a compressor (see column 1 line 9) and an evaporator which is inherently present in order to cool the interior of the refrigerator of Kobayashi et al, a storing means (5, see column 2 lines 16-17) for storing a cooling characteristic comprising a target physical amount as a function of operating time (2, Ts, see column 2 lines 25-26), a physical amount sensor able to detect a physical amount corresponding to the target physical amount at predetermined intervals of operating time (1, Ta, see column 2 lines 23-25 and lines 57-58); wherein the compressor comprises a plurality of performance levels (see column 2 lines 31-35); and an operation control means (5, see column 2 lines 16-17 and 29-35) for controlling the compressor by selecting an appropriate on' of the plurality of performance levels based upon a relationship between the physical amount and the target physical amount for a corresponding time; and Kobayashi et al discloses the refrigerating storage cabinet to store a plurality of cooling characteristics (see column 2 lines 48-68) and the operational control means to execute an appropriate one of the cooling characteristics based upon the physical amount, wherein the target physical amount is determined from the appropriate one of the plurality of cooling characteristics (see column 2 lines 48-68).

Regarding claim 36, the physical amount and target physical amount of Kobayashi et al are temperatures (Ta, Ts, see column 2 lines 26-28), the physical amount is the temperature of the inner atmosphere (see column 2 lines 23-25), the compressor is controlled by the operation control means (see column 2 lines 31-35) in which the cooling characteristic is a pull down characteristic (see column 2 lines 48-552) while the physical amount is in a temperature range from above a high temperature to near a set temperature, and the high temperature is higher than the set temperature by more than a predetermined value. Further, Kobayashi et al discloses the refrigerating storage unit to comprise an upper limit temperature that is higher by the predetermined value than a set temperature (Dn, see column 2 line 48), a lower limit temperature that is lower by the predetermined value than the set temperature (Dm, see column 2 line 54), a control-cooling zone between and including the upper limit temperature to the lower limit temperature (Dm, Dn, see column 2 lines 53-58, see also figure 2) wherein when the physical amount is in the control-cooling zone, the cooling characteristic is a control-cooling characteristic; wherein when the physical amount reaches the lower limit temperature from a temperature higher than the lower limit temperature, the compressor is not operated (see column 3 lines 18-20); wherein when the physical amount reaches the upper limit temperature from a temperature lower than the upper limit temperature, the compressor is operationally controlled by the operation control means (see column 2 lines 31-35).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 25, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Stamp (US patent No. 4,328,680).

Regarding claims 25, 26, and 28, Kobayashi et al discloses a physical amount change computing section computing a physical amount reduction degree for the physical amount based on the physical amount and a previously measured physical amount, wherein the physical amount reduction degree and the appropriate target physical amount reduction degree are used as inputs for the comparing section (temperature deviation detector, see column 2 lines 13-21 and 58-60). It is noted that Kobayashi et al does not explicitly disclose the use of an exponential function or a table of values as the pull down characteristic or the control characteristic. However, Stamp does explicitly disclose the use of a target time-temperature function which is exponential (see column 11 lines 8-16), or one which is constituted by a table of values. It would therefore have been obvious to one of ordinary skill in the art to use an exponential function or table of values, as in Stamp, in the system of Kobayashi et al in order to provide control of the compressor which is smoother and therefore less wearing.

9. Claims 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Longtin (US Patent No. 5,566,879).

Regarding claims 24 and 27, it is noted that Kobayashi et al does not explicitly disclose the control-cooling characteristic to be a quadratic function. However, Longtin discloses a quadratic function to be the ideal curve for variation

of temperature of the controlled area with respect to time (see column 8 lines 29-38) when modeling time-temperature curves. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to implement the quadratic function of Longtin in the system of Kobayashi et al as the cooling curve, in order to have a realistic time-temperature curve to attain.

10. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Okamoto et al (US Patent No. 4,959,969), further in view of Longtin (US Patent No. 5,566,879).

Regarding claim 29, it is noted that Kobayashi et al does not explicitly disclose the presence of multiple pull down zones. However, Okamoto et al does disclose the presence of multiple pull down zones (see table I; see also column 3 lines 32-39), with the appropriate one of the plurality of the pull down cooling characteristics executed based on the physical amount. Further, it would have been obvious to one of ordinary skill in the art to implement the multiple zones of Okamoto in the system of Kobayashi et al in order to improve efficiency of the system. Further regarding claim 29, it is noted that Kobayashi et al in view of Okamoto et al does not disclose the control-cooling characteristic to be a quadratic function. However, Longtin discloses a quadratic function to be the ideal curve for variation of temperature of the controlled area with respect to time (see column 8 lines 29-38) when modeling time-temperature curves. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to implement the quadratic function of Longtin in the system of

Kobayashi et al in view of Okamoto et al as the cooling characteristic, in order to have a realistic time-temperature curve to attain.

11. Claims 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Okamoto et al (US Patent No. 4,959,969).

Regarding claims 31 and 32, it is noted that Kobayashi et al does not explicitly disclose the presence of multiple pull down zones. However, Okamoto et al does disclose the presence of multiple pull down zones (see table I; see also column 3 lines 32-39), with the appropriate one of the plurality of the pull down cooling characteristics executed based on the physical amount. Further, it would have been obvious to one of ordinary skill in the art to implement the multiple zones of Okamoto in the system of Kobayashi et al in order to improve efficiency of the system.

Regarding claim 33, Kobayashi et al discloses the implementation of a cooling characteristic of a small temperature drop degree when a difference between the physical amount and the target physical amount is less than a predetermined value, and the appropriate cooling characteristic to include a large temperature drop degree when the difference between the physical amount and the target physical amount is greater than or equal to the predetermined amount (see column 2 lines 48-68).

Regarding claim 34, it is noted that Kobayashi et al does not explicitly disclose the use of an auxiliary cooling characteristic comprising a temperature curve in which a convergence temperature remains at a temperature higher by

an auxiliary predetermined value than the set internal temperature, with the auxiliary cooling characteristic selected as the appropriate one of the plurality of cooling characteristics when a difference between the physical amount and an evaporation temperature of the evaporator is at or above a predetermined auxiliary temperature value or when the physical amount is higher than the target physical amount by a predetermined auxiliary temperature value. However, the programming of such a mode in the controller of Kobayashi et al falls within the realm of common knowledge as an obvious mechanical expedient, and it would have been obvious to one of ordinary skill in the art at the time of the invention to implement one of the plurality of modes of Okamoto in the system of Kobayashi et al as such an auxiliary mode to promote energy savings in the overall system.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kaga et al (US Patent No. 6,931,872) discloses a cooling apparatus controlled by a microcomputer with varied rotational speed of the compressor. Cartwright et al (US Patent Application Publication No. 2002/0116936) discloses a chiller control system with customizable settings. Kikuchi et al (US Patent Application Publication No. 2003/0070438) discloses an air conditioning system with a characteristic and price database. Harris (US Patent No. 2,231,069) discloses a cooling system with variable rate compressor. McColloch (US Patent No. 2,801,799) discloses a thermostat for producing cyclical temperature variations within a refrigerator or freezer. Resh (US Patent No. 3,204,423) discloses a control system for a cooling apparatus which

accounts for degree of load. Harbour (US Patent No. 3,747,361) discloses a freezer with a fast chill feature. Hanson et al (US Patent No. 4,903,502) discloses the use of data tables for control of a cooling system. And Archer et al (US Patent No. 5,592,058) discloses a control system for a cooling system including memory and a microprocessor, as well as a variable speed compressor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXIS K. COX whose telephone number is (571)270-5530. The examiner can normally be reached on Monday through Thursday 8:00a.m. to 5:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached on 571-272-4834 or 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AKC/

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744